

**CLAIMS**

## 1. A fire fighting apparatus comprising:

(a) a bucket capable of being suspended from an aircraft, the bucket having an open upper end to enable the bucket to be filled with a fire retardant such as water, and

(b) a valve located in the region of the base of the bucket for permitting a controlled volume of the bucket load to be discharged remotely by the aircraft pilot, the valve being attachable to the aircraft by at least one remotely actuatable valve line, stay or cable that is not otherwise attached to the bucket, and at least one separate remotely actuatable bucket line, stay or cable that is not otherwise attached to the valve is provided for attaching the bucket to the aircraft, wherein the bucket and the valve are selectively movable relative to one another on independent actuation of the respective lines, stays or cables to facilitate opening or closing of the valve.

## 2. A fire fighting apparatus comprising:

(a) a bucket capable of being suspended from an aircraft, the bucket having an open upper end to enable the bucket to be filled;

(b) a valve located in the region of the base of the bucket for permitting the contents of the bucket to be discharged remotely by the aircraft pilot; and

(c) sensing means to dynamically sense a bucket attribute to enable the bucket to be filled or discharged to a pre-determined volume by the pilot.

3. A fire fighting apparatus according to claim 2, wherein the bucket attribute is the level of water in the bucket.

4. A fire fighting apparatus according to claim 2, wherein the bucket attribute is the weight of the bucket.

5. A fire fighting apparatus according to claim 2, 3 or 4, wherein the sensing means includes a pressure sensitive transducer that measures the pressure of hydraulic fluid associated with the apparatus, said pressure being directly proportional to the weight of the bucket.

6. A fire fighting apparatus according to claim 5, wherein the sensing means further includes a variable voltage regulator adapted to receive a measurement of pressure

from the transducer and control the opening and closing of the valve, the variable voltage regulator closing the valve when the pressure falls below a predetermined level, thereby trapping the proportional weight of water in the bucket.

7. A fire fighting apparatus comprising:

(a) a bucket capable of being suspended from an aircraft, the bucket having an open upper end to enable the bucket to be filled with a fire retardant such as water;

(b) a valve located in the region of the base of the bucket for permitting the contents of the bucket to be discharged from the bucket remotely by the aircraft pilot; and

(d) a reservoir for a chemical fire retardant, the reservoir having release means which when activated permits the flow of chemical fire retardant to the region of the underside of the valve where it becomes entrained with water being discharged through the valve.

8. A fire fighting apparatus according to claim 7, wherein the reservoir is located externally of the bucket.

9. A fire fighting apparatus according to claim 7 or claim 8, wherein the reservoir is capable of delivering the chemical fire retardant to the underside of the valve by a gravity feed.

10. A fire fighting apparatus according to any one of claims 7 to 9, wherein the release means includes at least one solenoid valve.

11. A fire fighting apparatus according to any one of claims 7 to 10, and further including a sensor for sensing the level or weight of water in the bucket.

12. A fire fighting apparatus according to claim 11, wherein the sensor is a pressure sensitive device which causes the valve to close when the weight of the bucket falls below a predetermined level.

13. A fire fighting apparatus according to claim 12, wherein the pressure sensitive device is a transducer.

14. A fire fighting apparatus according to claim 13, wherein the transducer operates indicator means to indicate to the pilot the volume or level of water in the bucket.

15. A fire fighting apparatus according to any one of claims 7 to 14, and further including means for restricting the flow of chemical fire retardant from the reservoir when the bucket has been emptied to a predetermined level.
- 5 16. A fire fighting apparatus according to claim 15, wherein the flow of chemical fire retardant from the reservoir is restricted when approximately 75% of the water has been emptied from the bucket.
- 10 17. A fire fighting apparatus according to any one of claims 5 to 16, wherein said valve is attachable to the aircraft by at least one remotely actuatable valve line, stay or cable that is not otherwise attached to the bucket, and at least one separate remotely actuatable bucket line, stay or cable that is not otherwise attached to the valve is provided for attaching the bucket to the aircraft, wherein the bucket and the valve are selectively movable relative to one another on independent actuation of the stays to facilitate opening or closing of the valve.
- 15 18. A fire fighting apparatus according to claim 1, and further comprising sensing means to dynamically sense a bucket attribute to enable the bucket to be filled or discharged to a pre-determined volume by the pilot.
19. A fire fighting apparatus according to claim 18, wherein the bucket attribute is selected from the level of water in the bucket and the weight of the bucket.
- 20 20. A fire fighting apparatus according to any one of claims 1, 18 or 19, and further comprising a reservoir for a chemical fire retardant, the reservoir having release means which when activated permits the flow of chemical fire retardant to the region of the underside of the valve where it becomes entrained with water being discharged through the valve.
- 25 21. A fire fighting apparatus according to any one of the preceding claims, wherein said valve comprises a valve body in the form of a disc having a pair of leaves capable of flexing about a substantially central hinged portion.
22. A fire fighting apparatus according to claim 21, wherein said leaves flex upwardly in a valve opening condition.
- 30 23. A fire fighting apparatus comprising:
  - (a) a tapered bucket capable of being suspended from an aircraft, the bucket having a bucket wall, an open upper end to enable the bucket to be filled with a

fire retardant such as water, and a bucket base comprising a pair of leaves or wings capable of flexing about a substantially central hinging region; and

(b) an actuator operable from the aircraft, the actuator including a hydraulic cylinder arrangement that utilises the weight of the water to apply a force to selectively flex the leaves about the hinging region between a closed position wherein a periphery of the leaves make a sealing contact with the bucket wall and an open position wherein a portion of the leaves extend upwardly from the hinging region permitting a volume of water to be discharged through a gap between the leaves and the bucket wall.

24. A fire fighting apparatus according to claim 23 wherein the hydraulic cylinder arrangement includes a weight bearing cylinder connected to the bucket wall, and a valve opening cylinder connected to the bucket base, means for temporarily reducing the weight held by the weight bearing cylinder and means for transferring a hydraulic fluid from the weight bearing cylinder to the valve opening cylinder in response to the temporary reduction in weight, wherein the transferred hydraulic fluid causes the valve opening cylinder to apply a force to flex the leaves from the closed position to the open position.